ing tonsillectomy, our lines of endeavor should be directed toward discovering, if possible, some specific organism which may be responsible for these conditions and its various portals of entry. We see so many cases of myocardial involvement in the third and fourth decades which show for the first time signs of heart failure but which we know have begun early in life following so-called acute inflammatory rheumatism, that it would be extremely worth while, were we able to institute treatment at the beginning of the infection, and to pursue some means directed toward the prevention of the endocarditis. Such a large percentage of all heart disease begins on a rheumatic basis that I feel insufficient thought and investigative work has been given to this very important phase of the subject.

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EUGENE S. KILGORE, M. D. (490 Post Street, San Francisco)—Doctor Ruddock's paper is an excellent summary of the present paucity of knowledge regarding rheumatic fever, a paucity which is astonishing and rather humiliating in view of the amount of effort which has been spent upon elucidation of the problem. The suggestion of a common etiology with subacute bacterial endocarditis is interesting in relation to certain geographical considerations. Typical rheumatic fever and chorea are considerably less common in California and the southern states than in New England and New York. And yet, though no adequate survey has been made, many of us feel that the late stages of rheumatic heart disease are observed about as commonly here as elsewhere. Sometimes we find them in the incipient stage following a simple sore throat but with no joint or nervous system involvement. If this impression is correct it suggests that climate modifies the manifestations of the disease rather than its frequency of occurrence. And this in turn makes easier the conception of two such different clinical and pathological pictures as rheumatic fever and subacute bacterial endocarditis being essentially the same disease.

INSULIN AND INTRAVENOUS GLUCOSE INJECTIONS—FOR VOMITING OF PREGNANCY

CASE REPORTS

By CHARLES HAROLD LEWIS, M. D.
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DISCUSSION *by J. Morris Slemons, M. D., Los Angeles; Cavins D. Hart, M. D., San Francisco; Emil Krahulik, M. D., Los Angeles.*

IN March, 1924, Thalhimer[1] reported three cases suffering from severe vomiting of pregnancy and having marked ketosis which were promtly relieved by the intravenous injection of glucose. He used approximately one unit of insulin to two or three grams of glucose and varied the amount of glucose according to the individual case. His previous experience led him to believe that the intravenous injection of glucose alone, produced only slight improvement in patients with post-operative, non-diabetic acidosis (a condition which he considered comparable to the vomiting of pregnancy), and he explained this as due to the impairment of the mechanism of carbohydrate metabolism. Insulin causes rapid utilization of glucose in the body. Hence, the improvement when insulin is used with the glucose injection, and the lack of improvement or only slight benefit which is noted if glucose is used alone. In this article Thalhimer advised the use of this method only for patients who were not relieved by other methods.

OTHER CASE REPORTS IN LITERATURE

In August, 1924, Thalhimer[2] reported five additional cases with similar results, but stated "only those cases should be treated with this method which have a severe acidosis." He suggested that pregnancy itself may interfere with carbohydrate metabolism mechanism, as well as the starvation which is produced from vomiting. Later Thalhimer reported two other cases with similar and more striking results.

Titus, Hoffman, and Givens[3] and Duncan and Harding,[4] working independently, recorded excellent results from the administration of glucose alone. Thalhimer contends that if insulin is used with the glucose, improvement is much more rapid. Doctor Sansum of Santa Barbara at the last meeting of the California Medical Association reported a case with marked improvement in which he gave insulin alone without glucose.

Referring again to the work of Titus,[5] he reported 328 cases which were treated by means of high carbohydrate feeding or intravenous glucose injections. He used one unit of insulin intravenously to five of glucose which was considered to be practically the same as Thalhimer's method, as the latter gave insulin subcutaneously. Titus explained the action of these substances as follows: "To offer a homely simile the injection of glucose alone is like pine fuel to a furnace which is burned low at the same time storing some in the fuel bin, whereas to add insulin to the glucose is like pouring kerosene on the coal to make it burn faster.

"If these views are correct the use of insulin with intravenous injections of glucose is contra-indicated in toxic vomiting of pregnancy and all other acidoses, because storage of sugar in the liver and not combustion in muscles is the effect desired."

The important conclusions which Titus formed in this article were:

First: Less than 50 to 75 grams of glucose at a dose do not give desired results.

Second: Hypertonic solutions (25 per cent) give best results.

Third: Single injections are better than a continuous flow, but may have to be repeated three or four times daily.

Fourth: Pregnancy toxemia and starvation acidosis are not identical.

E. L. King[6] in May 8, 1926, reported seven cases of the severe type and in four of them the results were very striking. From these seven cases King drew the following conclusions:

First: If there was any response to the treatment it was immediate.

Second: One patient was improved by use of the duodenal tube after glucose and insulin had failed.

Third: Repeated punctures of the veins soon resulted in thromboses.

Fourth: The method is an improvement over

former methods, and the use of insulin with glucose gives more prompt results.

By way of contrast to these enthusiastic and favorable reports it is of interest to note that MacLeod and Campbell [7] dismissed the subject by saying, "Use of insulin in pernicious vomiting of pregnancy is in our experience unnecessary."

CASE REPORTS

The cases here reported represent consecutive cases of hyperemesis gravidarum met with in private practice without respect to their severity. My purpose was to ascertain whether or not the use of this treatment was applicable to all pregnancy patients having nausea and vomiting, either mild or severe, and if not to all, then to what types:

CASE 1—Mrs. E. L., age 19, Para I, was admitted to the hospital four weeks before expected confinement. There was a history of little nausea and vomiting during the first part of her pregnancy, but during the four weeks previous to her admission she had vomited incessantly. After two days' stay in the hospital, during which time she was given soda and glucose solutions per rectum without improvement, she was given 300 cc. of 10 per cent glucose solution intravenously and fifteen units of U 20 insulin subcutaneously. About two hours and a half after these injections the patient was able to take water without vomiting, and two hours later ate dinner without difficulty. She continued to take food regularly for the next three days and was then discharged from the hospital, and continued to term without further complication. This case had resisted other methods of treatment such as frequent and forced feedings, use of corpus luteum, ovarian extract, rectal instillation of bromids, chloral hydrate, and the use of Murphy drip.

CASE 2—Mrs. E. G., age 20, Para I, in her seventh week of pregnancy reported nausea and vomiting throughout the day. Immediately after one injection of 20 cc. of 50 per cent glucose solution containing eight units of U 40 insulin she was much improved, and two weeks later reported only an occasional nausea. She had no reaction and was apparently much benefited.

CASE 3—Mrs. E. P., age 26, Para I, had complained of considerable nausea and vomiting, with headache, both night and day, and independent of taking food. Rectal instillation of bromid, daily injections of corpus luteum, and ovarian extract were tried without effect. After one injection of 20 cc. of 50 per cent glucose with eight units of insulin U 10, the patient was improved, and after a second injection was relieved of these symptoms for three weeks. She was then nauseated for a day, but improved without treatment. In this patient the improvement may not have been due to the treatment, since it was administered at the time when spontaneous improvement could have taken place.

CASE 4—Mrs. S. G., age 22, Para II, previous pregnancy and delivery normal. Patient received one injection of glucose and insulin with slight improvement, but refused further injections because she did not feel that her symptoms were severe enough to warrant her being put to the inconvenience involved in the use of a hypodermic, as she was rather sensitive to an injection and objected to venipuncture.

CASE 5—Mrs. H. L., age 31, Para II, had preclampsic toxemia during her first pregnancy, five years before. Also had considerable difficulty during first trimester of previous pregnancy with nausea and vomiting. At eighth week of pregnancy complained of marked nausea without vomiting. One injection consisting of 20 cc. of 50 per cent glucose and three units of insulin, U 40 was given. Patient improved immediately and did not complain for eight days. She then returned and the injection was repeated, with improvement which lasted for five days. After the third treatment the patient reported that she felt well and had no nausea. In this patient the symptoms were very mild and comparable to the so-called physiological morning sickness of which 50 per cent of pregnant women complain.

CASE 6—Mrs. G. T., age 35, Para IV. In her three previous pregnancies this patient had suffered from a severe type of hyperemesis gravidarum. She had been warned by her physician to avoid future pregnancies. Communications from the physician who had attended her during the three previous pregnancies stated that if her present pregnancy "proved as stormy as previous ones, termination would be indicated." However, the patient was willing to try any method of treatment in order to carry out the pregnancy, and the use of glucose and insulin was instituted. After three injections of 20 cc. of 50 per cent solution containing three units each of insulin U 40, the patient seemed much improved. Three days later she went for a long automobile trip, and nausea and vomiting returned. As a matter of experiment two injections of glucose were given on successive days without insulin. The patient vomited immediately after the second injection and also on the following day, at which time a sixth injection of glucose with three units of insulin was given. This was followed by the seventh and eighth injection. Vomiting grew progressively worse and patient was sent to a hospital. After one intravenous injection of 1000 cc. of 10 per cent glucose, and a subcutaneous injection of 1 cc. of U 40 insulin both at the beginning and close of the intravenous injection, the patient was much improved and after twenty-four hours in the hospital was allowed to go home, where she remained without return of symptoms for ten days. At this time the symptoms recurred in severe form. By now the veins had become thrombotic, and difficulty was experienced in making the injection. Patient objected to the treatment, but was kept in bed and the use of bromide continued. She remained fairly well until three weeks later, when the tenth week of pregnancy was reached. At that time the vomiting again became severe. Upon being readmitted to the hospital the patient asked that some other treatment than intravenous therapy be given. Accordingly she was given alternately 1 cc. of ovarian extract and corpus luteum extract every three hours during the first forty-eight hours. The dosage was then reduced gradually until at the end of the seventh day she received 1 cc. daily. At this time she was able to retain all her food and was again discharged from the hospital. This patient seemed to be one in whom glucose had very little, if any, effect, and if it produced improvement it was only transitory. It is problematical as to whether the ovarian extract and corpus luteum produced real benefit, inasmuch as they were used so near the twelfth week of pregnancy.

CASE 7—Mrs. M. C., age 20, Para I, complained of both nausea and vomiting, which was considerably relieved by one injection of glucose and insulin. One month later, however, she aborted spontaneously and completely, the products of conception having the appearance of an hydatidiform mole. Patient is still under observation and is apparently well.

CASE 8—Mrs. H. A., age 25, Para II. This patient had suffered much from nausea and vomiting during her previous pregnancy and at term was delivered of a normal but stillborn child, which the mother thought had been injured by forceps during delivery. She complained of marked nausea and vomiting, which was completely relieved by one injection of glucose and insulin, and she had no further difficulty with either nausea or vomiting during her pregnancy.

CASE 9—Mrs. V. C., age 29, Para I, reported nausea with occasional vomiting. This patient was relieved by one injection of glucose and insulin and had no further difficulty.

CASE 10—Mrs. R. G., age 21, Para II, suffered from nausea and vomiting during her first pregnancy, and had never felt well since her confinement two years ago. Felt tired and had occasional nausea and vomiting. After one injection of glucose and insulin patient had no nausea for ten days. The treatment was re-

peated and subsequently there was no return of symptoms.

CASE 11—Mrs. H. J., age 30, Para III, had nausea and vomiting during the first trimester of two previous pregnancies. Second pregnancy resulted in spontaneous abortion at three months which was thought by the patient to have been due to retroversion. Severe nausea continued after four injections of glucose and insulin, but became less for six days after the fifth injection. After the sixth and seventh injections the patient experienced a queer feeling with some nervousness after her return to her home and accordingly treatment was discontinued, the insulin being looked upon as having been responsible for the reaction. As the nausea and vomiting were not of the severe type patient was treated subsequently by regulation of habits and diet, and symptoms disappeared after the fifteenth week of pregnancy. This patient was the only one of the series in whom there was any reaction.

CASE 12—Mrs. G. Q., age 29, Para II. First pregnancy resulted in stillbirth. During the first trimester of first pregnancy this patient had marked nausea and vomiting, and occasionally throughout the remainder of her pregnancy. After three injections of glucose and insulin the patient reported marked improvement and had no return of symptoms for three weeks. At this time the nausea returned and a fourth injection was given. Afterward the patient experienced nausea only once and had no further vomiting.

COMMENT

This series of cases differs from those reported by other writers in that only two of the patients were of the severe type of hyperemesis gravidarum. The others were mild cases, but were sufficiently severe not to have been improved by ordinary methods of treatment, such as regulation of diet, habits, hygiene, elimination, and the administration of ovarian extract by mouth or of ovarian extract and corpus luteum hypodermically.

My thought in using this method in consecutive cases, without respect to laboratory findings, was to learn whether or not this treatment might have an application to all cases of nausea and vomiting during pregnancy, whether mild or severe.

During the time that these patients were treated I also had one patient who had such a marked retroversion that I felt that it would be folly to endeavor to use any other treatment than reposition of the uterus and temporary use of a pessary. The patient reported very prompt relief from symptoms. In that patient the method of treatment under discussion would not have been of any value.

CONCLUSIONS

From my experience I submit the following conclusions:

1. The use of glucose and insulin offers marked benefit in certain patients suffering from nausea and vomiting of pregnancy.

2. In properly selected patients 20 cc. of 50 per cent glucose solution containing five units of insulin may be given intravenously, as an office procedure.

3. Some cases are improved and relieved of symptoms when they have resisted all other recognized forms of treatment.

4. This type of treatment is only indicated for patients in which there is a derangement of carbohydrate metabolism, either from the pregnancy itself or from the result of continuous vomiting. Other forms of hyperemesis in which a different etiology obtains should be treated by appropriate methods.

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DISCUSSION

J. MORRIS SLEMONS, M. D. (819 Pacific Mutual Building, Los Angeles)—Of late a great deal has been said about the cause of and the cure for the nausea and vomiting incident to the early months of pregnancy. A degree of enthusiasm, sometimes not too modest, entertained by advocates of one form of treatment or another, has not been shared by other practitioners who put to test the measures so confidently recommended. Cases of pernicious vomiting continue to vex us; and occasionally they resist treatment of every description, requiring ultimately a radical and regrettable step—the termination of the pregnancy. The studies of Doctor Lewis, therefore, are not untimely. His unbiased, critical and sometimes skeptical attitude toward his results is noteworthy and commendable. His report provides a welcome example of research conducted effectively in connection with private practice.

The usefulness of glucose in certain cases of vomiting of pregnancy has been definitely established; but opinions differ regarding the benefit derived from the addition of insulin. At present the weight of authority favors its omission. This conclusion was reached by Titus, a pioneer in the introduction of the method, whose broad experience has furnished the material for several papers describing very satisfactory results. The omission of insulin is favored also by MacLeod and Campbell. Their recommendation becomes the more impressive because any prejudice they might have would favor its use. Finally Dieckmann and Crossen of Washington University, St. Louis, where glucose with insulin was first used in cases of vomiting of pregnancy, advocate the omission of insulin except in cases where a large quantity of glucose is administered. The employment of glucose with insulin, they declare, is generally unnecessary; and, furthermore, an element of danger may be associated with it.

The glucose, of course, is intended to provide a supply of glycogen for an organism stripped of this reserve material. The administration of small doses will not go far in this direction. When its use is indicated, glucose is required in large dosage by patients who are ill and in need of hospital care. If disturbed by the vomiting of pregnancy only to a slight degree and therefore able to visit a doctor's office, a patient probably would find relief with equal promptness by

the adoption of a suitable dietary regimen and the employment of therapeutic measures somewhat simpler than the intravenous administration of glucose.

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CAVINS DETER HART, M. D. (380 Post Street, San Francisco)—Doctor Lewis is to be commended for his research in a subject that today is being so extensively investigated in the attempt to relieve the pregnant patient of one of her most distressing complications.

My experience in the use of glucose with insulin in the vomiting of pregnancy has been limited, as I have felt that we were dealing with a deficiency in the carbohydrates rather than with an inability of the nondiabetic patient to utilize the sugars. Titus has been one of the early advocates of this theory and finds no use for the insulin in the early or late toxemias of pregnancy except where large amounts of glucose are used.

There are two objections to the intravenous use of glucose in the mild vomiting cases. The first objection is that most of these cases will respond to rest and proper dietary routine. The education of the young women of today is helping a great deal, as they no longer consider nausea and vomiting necessary. They consult their medical advisers early, and we no longer see so many neglected severe cases. The second objection is the destruction of the veins by thrombosis which so often occurs after glucose therapy.

In the severe cases of vomiting in pregnancy intravenous glucose therapy is indicated. Titus does not use insulin in these cases. Dieckmann and Crossen use it only in cases where large quantities of glucose are given intravenously. The last two investigators feel that large quantities of fluids are most essential. They recommend 1500 to 3000 cc. of Ringer's solution intravenously and 1000 to 2000 cc. of 10 per cent glucose intravenously in a period of twenty-four hours. The fluids are used to establish diuresis and the glucose is given for food.

My most satisfactory results in the severe cases have been obtained by giving a liter of 10 per cent glucose twice daily until diuresis is well established and the vomiting has ceased.

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EMIL KRAHULIK, M. D. (1680 Vine Street, Los Angeles)—Nausea and vomiting during the first half of pregnancy divides, according to severity, into three classes: (1) mild, which responds rather promptly to suggestion and a hygienic and dietary regimen; (2) moderately severe; and (3) severe.

Patients coming under the third classification are sufficiently ill to warrant hospitalization and their management is not difficult to outline, whatever its success. Class two is a group of very uncomfortable people to whom we do not bring very much relief. They are able, with effort, to retain food, but they vomit every day and are nauseated almost all of the time. They are not considered ill enough to be confined to bed, or even to require nursing service and yet they are almost totally incapacitated. The satisfactory treatment of the severe cases requires special nursing and entails considerable expense. Therefore it is not practical treatment for the second group.

Doctor Lewis made his suggestion to me some time ago. I have given a daily intravenous injection of 20 cc. of a 50 per cent glucose solution, without insulin, to three patients of the moderately severe type. Instead of being given in the office the injection was given at home, with the patient in bed during the course of the treatment and for one day previously on the usual hygienic and dietary routine. Each received six injections. Encouraging results were not noted. In the last patient the course was repeated using 40 cc. of the glucose solution, and a subcutaneous injection of ten units of insulin. The patient is now three and one-half months pregnant and continues to be nauseated, but vomits less frequently. The procedure is easy and deserves further trials.

In severe hospital cases I have been giving 1000 cc. of a 5 per cent glucose solution, without insulin, by hypodermoclysis with some success. The only advantage of the intravenous method is that more concentrated solutions may be given. Administration by either method must be slow.

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DOCTOR LEWIS (closing)—The discussions of Doctors Slemons, Hart, and Krahulik are exceedingly helpful, and they have touched upon some of the most important considerations of this subject. Since writing the above article I have used this form of treatment in eight other patients and uniformly with good results, except in two patients where the injections were given early and in which there was found no evidence of acidosis. At present I am making the urine tests for acetone and diacetic acids on all such patients and do not institute the insulin and glucose treatment unless these substances are present in the urine. I am more than ever convinced that improvement cannot be expected (as I stated in the last paragraph of my paper) unless there is derangement of carbohydrate metabolism and some evidence of at least beginning acidosis.

RENAL SURGERY: ITS PITFALLS AND COMPLICATIONS*

By CHARLES P. MATHÉ, M. D.
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DISCUSSION *by James R. Dillon, M. D., San Francisco; Frank Hinman, M. D., San Francisco; Guy Manson, M. D., Fresno.*

YEARS ago operations upon the kidney were accompanied by an unusually large mortality and often followed by unpleasant complications. An intelligent study and interpretation of renal function has lowered the mortality. Painstaking postoperative care has reduced the number of complications. An analysis of these complications with the purpose of preventing them or of lowering their frequency is of great importance. In reviewing 370 operative renal cases at St. Mary's Hospital, dating back to the fire of 1906, I am enumerating the complications and pitfalls encountered with the purpose of improving the technique in order that such complications may be prevented in the future. The 370 cases reported herein have been consecutive, occurring among several thousand cases seen with kidney lesions. Many which apparently seemed to be operative cases were prevented reaching the operative stage by proper preparation and care. Two hundred and ninety-three of the cases enumerated were operated upon by the author and seventy-seven by other surgeons.

COMPLICATIONS OF RENAL SURGERY

The more common complications encountered in the above series of cases were: shock, 10; hemorrhage, 8; postoperative hemorrhage, 2; cardiac complication, 4; phlebitis, 9; embolus formation, none; fistula discharging urine and pus, 6; anuria, 2; peritonitis, none; pneumonia, 1; pulmonary edema, none; septicemia, 1; cervical neuritis, 1; and abscess of the kidney overlooked at time of operation, 4.

Shock—Surgical shock or exhaustion occurred more often in patients who lost a large amount of blood, after the difficult removal of a large adherent kidney. It was also caused by preoperative fear, worry or insomnia, and was readily rec-

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